This amendment is in response to the Office Action dated December 4, 2001. Reconsideration of this application in view of the technical amendments and remarks made herein is respectfully requested.

Claims 1-5, 7-23, 25-27, 29-32, 34-44, 64 and 65 are pending. Claims 5, 7, 16-19, 34-42, 44, 64 and 65 have been deleted to be fully responsive to the restriction requirement. Applicants have made technical amendments to claims 1-4, 8-15, 20-22, 23, 29-32 and 43 and to the specification. In addition, Applicants have added new claims 66-80. No new matter has been added by the amendments to the claims, the new claims and the specification.

In accordance with 37 C.F.R. §1.121, applicants have provided (1) accurate instructions to amend the claims, (2) replacement claims in clean form herein, and (3) another version of the amended claims marked up to show all the changes relative to the previous version of the claims, which appears on an attached page.

I. ELECTION/RESTRICTION

Applicants acknowledge that claims 1-4, 8-15, 20-23, 25-27, 29-32 and 43 with SEQ ID Nos:1 and 2 have been elected and that claims 5, 7, 16-19, 34-42, 44, 64 and 65 have been withdrawn from consideration in this application. Applicants have formally deleted claims 5, 7, 16-19, 34-42, 44, 64 and 65 by this communication. Applicants reserve the right to pursue the nonelected subject matter in divisional applications.

II. SPECIFICATION

The Examiner has indicated that the specification lacks an Abstract. Applicants have amended the specification to include the Abstract that was published in WO 99/14337, to

which this application claims priority and have directed that the abstract be added as a separate page of the specification. Accordingly, Applicants have provided the abstract on a separate page herewith.

In addition, the Examiner has objected to the title of the invention, indicating that it is not descriptive. In response, Applicants have amended the title to a more descriptive title.

III. REJECTIONS UNDER 35 U.S.C. § 101:

The Examiner has rejected claims 1-4 under 35 U.S.C. § 101 alleging that the claims are directed to nonpatentable subject matter because the claims are directed to a polynucleotide sequence, which reads on a product of nature. In response, Applicants have amended claims 1-4 which are now directed to "an isolated polynucleotide." Therefore, Applicants respectfully request that the rejection under 35 U.S.C. § 101 be withdrawn.

IV. REJECTIONS UNDER 35 USC §112 ¶ 2:

Claims 1-4, 8-15, 20-23, 25, 29-32 and 43 are rejected under 35 U.S.C. § 112, ¶ 2 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner bases his rejection on the following reasons.

For claim 1, the examiner contends that the phrase "capable of hybridizing selectively" is indefinite because it is unclear whether hybridization actually occurs or how selectively is defined. In response, Applicants have amended claim 1 to recite that the polynucleotide hybridizes selectively to the coding sequence of SEQ ID No. 1, making it clear that it does hybridize. In addition, Applicants assert that the specification clearly teaches what

selective hybridization means, *see, e.g.,* page 15, line 30 through page 16, line 6 and page 18, lines 17-18. Applicants have added new claims 66-77 which are directed to the selective hybridization conditions disclosed in the specification.

For claim 4, the Examiner contends that the phrase "or a fragment thereof" is indefinite. In response, Applicants have deleted this phrase from claim 4.

For claim 8, the Examiner alleges that the phrase "a polynucleotide according to claim 1" is indefinite because it is unclear to which polynucleotide the claim is directed. In response, Applicants have amended claim 8 to recite "the isolated polynucleotide according to claim 1" as suggested by the Examiner.

For claim 9, the Examiner contends that the term "a chimeric gene" lacks antecedent basis. Applicants have amended claim 9 to recite "the chimeric gene of claim 8" thereby correcting any improper antecedent basis.

For claim 10, the Examiner alleges that the phrases "a polynucleotide" and "a chimeric gene" are indefinite and suggests amending these phrases to "the polynucleotide" and "the chimeric gene" respectively. Applicants have amended claim 10 according to the Examiner's suggestion.

For claim 11 and 12, the Examiner alleges that the term "a vector" should read "the vector" in referring to claim 10. Applicants have amended claims 11 and 12 according to the Examiner's suggestion.

For claim 13, the Examiner contends that the term "A cell" is indefinite and suggests amending the claim to recite "The cell". Applicants have amended claim 13 according to the Examiner's suggestion.

For claim 14, the Examiner alleges that the phrase "a chimeric gene" is indefinite and suggests amending the phrase to "the chimeric gene". Applicants have amended claim 14 according to the Examiners suggestion.

For claim 15, the Examiner alleges that the phrase "A cell" is indefinite and suggests amending the phrase to "The cell" in referring to claim 14. Applicants have amended claim 15 according to the Examiner's suggestion.

For claim 20, line 2, claim 21, line 2, and claim 22, line 2, the Examiner alleges that the phrase "an expression vector" should read "the expression vector" in referring to claim 11. Applicants have amended claims 20, 21 and 22 according to the Examiner's suggestion.

For claim 23, line 3, the Examiner alleges that the phrase "plant obtainable by a method" is indefinite and should read "the plant produced by the method" in referring to the transgenic method of claim 21. Applicants have amended claim 23 to read "the plant obtained by the method" in referring to the transgenic method of claim 21.

For claim 25, the Examiner alleges that the claim is indefinite because it refers to a transgenic first generation plant, plant seed or progeny plant of claim 20, but claim 20 does not refer to these elements and because it indicates that the recited elements are "obtainable" by the method of claim 20. In response, Applicants have deleted any elements which do not exist in claim 20 and have amended the term "obtainable" to "obtained" when referring to claim 20.

For claim 29, line 2, the Examiner alleges that the phrase "a polynucleotide" is indefinite and should read "the polynucleotide" when referring to claim 1. Applicants have amended claim 20 to read "the isolated polynucleotide" when referring to claim 1.

For claim 30, line 1, the Examiner alleges that the phrase "a nucleic acid construct" is indefinite and should read "the nucleic acid construct" when referring to claim 29. Applicants have amended claim 30 according to the Examiner's suggestion.

For claim 31, the Examiner alleges that the phrase "a construct" is indefinite and should read "the construct" when referring to claim 29. Applicants have amended claim 31 to read "the nucleic acid construct" when referring to claim 29.

For claim 32(a), the Examiner alleges that the limitation "whose herbicidal activity... comprising two GST subunits" is unclear because at 32(b), the vector according to claim 20 only comprises a coding region for one GST subunit. Applicants respectfully disagree that claim 32 is unclear or indefinite. In claim 32(a) the limitation referred to by the Examiner indicates that the herbicide used in the method is an herbicide whose activity is reduced by the presence of a dimeric protein comprising two GST subunits. The vector of claim 29 expresses a GST subunit, this subunit, when expressed, may dimerize with itself (since more than one of the same subunit may be expressed from the vector) or may dimerize with another GST subunit found in the cell. Therefore, it is unnecessary for the vector to comprise more than one polynucleotide expressing a GST subunit. However, to add even further clarity to claim 32, applicants have amended the claim to indicate that the expressed GST subunit can dimerize with another GST subunit.

The Examiner has also rejected claim 47 under 35 U.S.C. § 112, second paragraph. However, this claim was cancelled in Applicants' Preliminary Amendment dated March 15, 2002. The Examiner has acknowledged in the Office Action that this claim is not pending. Applicants believe the Examiner's intent was to reject claim 43 because he indicated his intent to reject claim 43 on page 4 of the Office Action. Therefore, Applicants will address

the rejection of claim 47 as though it were a rejection of claim 43. For claim 43, the Examiner alleges that it is unclear to which transgenic plant the claimed method is directed and that the claim is directed to non-elected subject matter. Applicants have amended claim 43 to indicate that the transgenic plant is the transgenic first generation plant or transgenic progeny plant of claim 25 and has further removed reference to the dimeric protein of claim 7, which is a non-elected claim, and replaced the reference to claim 7 to a reference to a dimeric GST protein.

For all of the foregoing reasons, Applicants respectfully request that the rejections of claims 1-4, 8-15, 20-23, 25, 29-32 and 43 under 35 U.S.C. § 112, second paragraph, be withdrawn.

V. REJECTIONS UNDER 35 U.S.C. § 112, FIRST PARAGRAPH

The Examiner has rejected claims 1 and 2 under 35 U.S.C. § 112, first paragraph as containing subject matter that was not described in the specification in such a way as to enable one skilled in the art to make and use the invention. The Examiner alleges that Applicants lack a written description of the genus of polynucleotides that encode a GST subunit as broad as the genus being claimed.

Applicants respectfully disagree that the specification does not describe a genus of polynucleotides as broad as that of claims 1 and 2. Claim 1 has been limited to SEQ ID No. 1 and sequences which selectively hybridize to SEQ ID No. 1. As noted above, the specification provides a detailed description of selective hybridization. Applicants point out that the specification further teaches functional equivalents of glutathione transferase sequences related to SEQ ID No. 1. *See* pate 15, lines 20-22. In addition, the specification teaches GST sequences described in terms of strength of hybridization over background under specific hybridization

conditions. *See* page 15, line 26 through page 16, line 3. The specification also teaches homologues of SEQ ID No. 1. *See* page 16, lines 8-14. Furthermore, the specification teaches GST sequences with modified nucleotides and/or backbones. *See* page 16, lines 23-27. The specification also teaches ways to identify allelic variants of GST sequences related to SEQ ID No. 1 (page 17, lines 3-7), the properties of an allelic variant (page 21, lines 16-24), GST sequences with optimized codon usage and/or engineered restriction sites (page 18, line 29 to page 19, line 4) and how to produce conservative substitutions (page 22, lines 18-22 and the chart on page 22). As such, Applicants assert that the specification does provide an adequate written description commensurate with the scope of claim 1 and 2. Therefore, Applicants request that the rejection of claims 1 and 2 under 35 U.S.C. § 112, first paragraph be withdrawn.

VI. REJECTIONS UNDER 35 USC § 102(a)

Claims 1, 2 and 4 stand rejected under 35 USC § 102(a) as allegedly anticipated by Riechers et al. 1997 (Plant Physiology 114:1461-1470).

Specifically, the Examiner alleges that Riechers discloses an isolated polynucleotide encoding a glutathione transferase subunit, isolated from wheat, which is capable of hybridizing selectively to the coding sequence of SEQ ID No. 1, which is a DNA molecule. The Examiner further alleges that Riechers discloses a fragment of SEQ ID No. 1 and therefore Riechers has previously disclosed all the limitations. Applicants respectfully disagree that Riechers discloses all the claim limitations of the claim limitations. Moreover, Applicants assert that the present invention was made prior to the priority date of Riechers et al. and therefore, Riechers et al. is not available as 102(a) art against the present invention. Applicants provide a Declaration under 37 C.F.R. § 1.131 signed by co-inventor Ian Cummins and the relevant notebook pages of co-

inventor Ian Cummins which demonstrate that the present invention was made prior to August 11, 1997.

Therefore, Applicants respectfully request that the rejection of claims 1, 2 and 4 under 35 U.S.C. § 102(a) be withdrawn.

VII. REJECTIONS UNDER 35 USC § 102(e)

Claims 1, 2 and 4 stand rejected under 35 USC § 102(e) as allegedly anticipated by McGonigle et al. (US Patent No. 5,962,229).

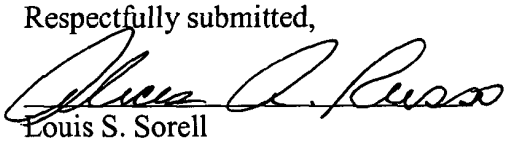
Specifically, the Examiner alleges that McGonigle discloses an isolated polynucleotide that is capable of hybridizing selectively to the coding sequence of SEQ ID No. 1, in addition to a 23 base pair fragment thereof as defined by Applicant on page 16, paragraph 2. The Examiner further alleges that McGonigle discloses a chimeric gene, vector and transformed prokaryotic and plant cells comprising said isolated polynucleotide and inherently discloses transformed plants, progeny thereof, seed thereof, and callus thereof, in addition to methods of making the same. The Examiner further alleges that McGonigle also discloses a method of controlling the growth of weeds at a locus comprising said transformed plants and therefore, McGonigle has previously disclosed all of the claim limitations of claims 1, 2 and 4.

Applicants respectfully disagree that McGonigle discloses all of the limitations of the claims of the present application. Nonetheless, as noted above, McGonigle is also not available as 102(e) art because the present invention was made prior to August 11, 1997, as evidenced by the enclosed Declaration under 37 C.F.R. § 1.131 signed by co-inventor Ian Cummins. Therefore, Applicants respectfully request that the rejection of claims 1, 2 and 4 under 35 U.S.C. § 102(a) be withdrawn.

VIII. CONCLUSION

In view of the amendments to the claims and the remarks herein, Applicants maintain that the Claims are now in condition for allowance. A Notice of Allowance is earnestly solicited.

Respectfully submitted,



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MARKED UP VERSION OF TECHNICAL AMENDMENTS

IN THE CLAIMS

Please delete claims 5, 7, 16-19, 34-42, 44, 64 and 65.

Please rewrite the claims as follows:

1. (Amended) An isolated polynucleotide encoding a glutathione transferase (GST) subunit, which polynucleotide comprises a coding sequence which hybridizes [capable of hybridising] selectively to the coding sequences of SEQ ID No. 1[, 3, 5, 7, 9, 11, 13, 15 or 17] or to the compliment of SEQ ID No. 1 [of one of these sequences].

2. (Amended) [A] The isolated polynucleotide of claim 1, wherein the polynucleotide [which] is a DNA sequence.

3. (Amended) [A] The isolated polynucleotide according to claim 1, wherein the coding sequence encodes the amino acid sequence of SEQ ID No. 2[, 4, 6, 8, 10, 12, 14, 16 or 18].

4. (Amended) [A] The isolated polynucleotide according to claim 1, wherein the polynucleotide is [which comprises the] coding sequence of SEQ ID No. 1[, 3, 5, 7, 9, 11, 13, 15 or 17 or a fragment thereof].

8. (Amended) A chimeric gene comprising the [a] polynucleotide according to claim 1 operably linked to regulatory sequences that allow expression of the coding sequence in a host cell.

9. (Amended) [A] The chimeric gene according to claim 8 [7] wherein the regulatory sequences allow expression of the coding sequence in a plant cell.

10. (Amended) A vector comprising the [a] polynucleotide according to any one of claims 1 to 4 or [a] the chimeric gene according to claim 8 or 9.

11. (Amended) [A] The vector according to claim 10 which is an expression vector.

12. (Amended) A cell transfected with [a] the vector according to claim 10.

13. (Amended) [A] The cell according to claim 12 [which], wherein the cell is selected from the group consisting of a prokaryotic cell [or] and a plant cell.

14. (Amended) A cell, having integrated into its genome, [a] the chimeric gene according to claim 8.

15. (Amended) [A] The cell according to claim 14 [which], wherein the cell is a plant cell.

20. (Amended) A method of obtaining a transgenic plant cell comprising:

(a) transforming a plant cell with [an] the expression vector according to claim 11 to [give] obtain a transgenic plant cell, and optionally,

(a') transforming the cell with one or more further polynucleotide sequences coding for a GST subunit, operably linked to regulatory elements that allow expression of the subunit in the cell.

21. (Amended) A method of obtaining a first-generation transgenic plant comprising:

[(b)] (a) transforming a plant cell with [an] the expression vector according to claim 11 to [give] obtain a transgenic plant.

22. (Amended) A method of obtaining a transgenic plant seed comprising:

[(c)] (a) obtaining a transgenic seed from [a] the transgenic plant [obtainable] obtained by step (a) of claim 21.

25. (Amended) A transgenic plant cell[, first generation plant, plant seed or progeny plant obtainable] obtained by [a] the method according to claim 20.

29. (Amended) A nucleic acid construct comprising:

(a) [a] the isolated polynucleotide according to claim 1 operably linked to regulatory elements that allow expression of the coding sequence in a plant cell; and

(b) a site into which a further polynucleotide comprising a coding sequence can be inserted.

30. (Amended) [A] The nucleic acid construct according to claim 29, wherein the site of step (b) is bounded by regulatory elements that allow expression of a coding sequence inserted at the site in a plant cell.

31. (Amended) A vector comprising [a] the nucleic acid construct according to claim 29.

32. (Amended) A method of transforming a plant cell or of obtaining a plant cell culture or transgenic plant, the method comprising:

(a) providing an untransformed plant cell which is susceptible to a herbicide whose herbicidal activity is reduced by a dimeric protein comprising two GST subunits;

(b) transforming the plant cell with [a] the vector according to claim 29;

(c) cultivating the transformed cell under conditions that allow the expression of the polynucleotide encoding a GST subunit to provide a polypeptide comprising a GST subunit, wherein the polypeptide comprising the GST subunit can form a dimer with another GST subunit; and/or

(c') regenerating the cell to give a cell culture or plant such that the polynucleotide is expressed to provide a polypeptide comprising a GST subunit, wherein the polypeptide comprising the GST subunit can form a dimer with another GST subunit; [and]

(d) contacting the cell, cell culture or plant with the herbicide whose herbicidal activity is reduced by the dimeric protein, and to which the untransformed plant cell was susceptible, and

(e) selecting cells, cell cultures or plants that are less susceptible to the herbicide than are corresponding untransformed cells, cell cultures or plants.

43. (Amended) A method of controlling the growth of weeds at a locus where a transgenic first-generation plant or transgenic progeny plant according to claim 25 is being cultivated, which method comprises applying to the locus a herbicide whose herbicidal properties are reduced by [a dimeric protein according to claim 7] a dimeric GST protein.

Please add the following new claims:

66. (NEW) An isolated polynucleotide having a coding sequence which hybridizes to the coding sequence of SEQ ID No. 1 or to its complement at from about 50° C to about 60° C in the presence of 0.03 M sodium chloride and 0.03 M sodium citrate.

67. (NEW) An isolated polynucleotide having a coding sequence which hybridizes to the coding sequence of SEQ ID No. 1 or to its complement at about 60° C in the presence of 0.03 M sodium chloride and 0.03 M sodium citrate.

68. (NEW) An isolated polynucleotide having a coding sequence at least 70% identical to the coding sequence of SEQ ID No. 1 or its complement.

69. (NEW) The isolated polynucleotide of claim 68 having a coding sequence is at least 80% identical to the coding sequence of SEQ ID No. 1 or its complement.

70. (NEW) The isolated polynucleotide of claim 69 having a coding sequence at least 90% identical to the coding sequence of SEQ ID No. 1 or its complement.

71. (NEW) The isolated polynucleotide of claim 69 having a coding sequence at least 95% identical to the coding sequence of SEQ ID No. 1 or its complement.

72. (NEW) The isolated polynucleotide of claim 69 having a coding sequence at least 98% identical to the coding sequence of SEQ ID No. 1 or its complement.

73. (NEW) The isolated polynucleotide of claim 69 having a coding sequence at least 99% identical to the coding sequence of SEQ ID No. 1 or its complement.

74. (NEW) An isolated polynucleotide having a nucleic acid sequence at least 95% identical to at least about 60 contiguous nucleotides of SEQ ID No. 1 or its complement.

75. (NEW) The isolated polynucleotide of claim 74 having a nucleic acid sequence at least 95% identical to at least about 100 contiguous nucleotides of SEQ ID No. 1 or its complement.

76. (NEW) The isolated polynucleotide of claim 75 wherein the nucleic acid sequence is at least 99% identical to at least about 100 contiguous nucleotides of SEQ ID No. 1 or its complement.

77. (NEW) A first generation transgenic plant produced by the method according to claim 21.

78. (NEW) A plant seed or progeny plant produced by the a method according to claim 22.

79. (NEW) An isolated polynucleotide comprising the coding sequence of SEQ ID NO:1 or allelic variants thereof.

80. (NEW) An isolated polynucleotide encoding a polypeptide having a sequence of SEQ ID NO:2 modified by up to about 30 conservative amino acid substitutions.

IN THE SPECIFICATION

Please rewrite the title as follows:

[NEW PLANT GENES] GLUTATHIONE TRANSFERASE NUCLEIC ACIDS, POLYPEPTIDES, TRANSGENIC PLANTS AND METHODS OF USE THEREOF

Please add the following abstract after page 70 of the specification:

This invention relates to glutathione transferase (GST) subunits, to nucleic acid sequences encoding glutathione transferase subunits, and to sues of these glutathione transferases and coding sequences, especially in the field of plant biotechnology.

ABSTRACT

This invention relates to glutathione transferase (GST) subunits, to nucleic acid sequences encoding glutathione transferase subunits, and to sues of these glutathione transferases and coding sequences, especially in the field of plant biotechnology.